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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/731,436	12/10/2003	Takeo Kuramoto	1057/HIROSE	5110

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EXAMINER	
HARRISON, MONICA D	

ART UNIT	PAPER NUMBER
2813	

DATE MAILED: 01/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/731,436	KURAMOTO ET AL.	
	Examiner	Art Unit	
	Monica D. Harrison	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 August 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9,18,21-24 and 27-29* is/are pending in the application.

4a) Of the above claim(s) *19, 20, 25 and 26* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-9, 18, 21-24 and 27-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. The amendment filed 8/5/05 has been entered. Examiner acknowledges claims 19, 20, 25 and 26 have been cancelled and newly admitted claims 27-29 have been entered.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-9, 21-24, and 27-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Gaku et al (6,097,089).

2. Regarding claim 1, Gaku et al discloses a solder ball assembly for use in the formation of solder bumps comprising a heat-resisting sheet having a plurality of holes and comprising first and second heat resisting layers (Figure 1, reference 4d), a solder ball disposed in each hole (Figure 2, reference 7-1i), an adherent layer sandwiched between the first and second heat resisting layers and (Figure 1, reference 4c), exposed to the interior of each hole in such a manner that the adherent layer contacts and holds the solder ball in the hole, and a covering sheet spaced from the adherent layer and placed atop the heat resisting sheet to cover the solder balls disposed in the holes (Figure 1, reference 1a).

3. Regarding claim 2, Gaku et al discloses wherein the heat resisting sheet comprises a material selected from the group consisting of resins, metals, ceramics, paper and combinations of two or more of these materials (Figure 1, reference 4d).

4. Regarding claim 3, Gaku et al discloses wherein the adherent layer is exposed to the interior of each hole on a wall of the hole (Figure 1, reference 4c).

5. Regarding claim 4, Gaku et al discloses wherein each hole has a bottom surface and the adherent layer is exposed to the interior of the hole on the bottom surface of the hole (Figure 2, reference 7-1i)

6. Regarding claim 5, Gaku et al discloses wherein each hole is straight and has a wall extending perpendicularly to a surface of the heat resisting sheet (Figure 1, reference 6e).

7. Regarding claim 6, Gaku et al discloses wherein each hole is tapered and has a diameter which gradually decreases toward a bottom of the hole (Figure 1, reference 6e).

8. Regarding claim 7, Gaku et al discloses wherein each hole is a blind hole (Figure 1, reference 7e).

9. Regarding claim 8, Gaku et al discloses wherein the depth of each blind hole is at least one third the diameter but smaller than the diameter of the solder ball disposed therein (Figure 1, reference 6e).

10. Regarding claim 9, Gaku et al discloses wherein the depth of each blind hole is at least one half the diameter but smaller than the diameter of the solder ball disposed therein (Figure 1, reference 6e).

11. Regarding claim 21, Gaku et al discloses wherein the adherent layer extends between adjoining holes inside the heat resisting sheet (Figure 1, reference 4c).

12. Regarding claim 22, Gaku et al discloses wherein the adherent layer comprises a sheet of an adhesive material formed separately from the first and second heat resisting layers (Figure 1, reference 3c).

13. Regarding claim 23, Gaku et al discloses wherein the adherent layer prevents the solder balls from falling out of the holes when the covering sheet is removed from the heat resisting sheet and the assembly is oriented such that the solder balls would fall out of the holes in the absence of the adherent layer (Figure 1, reference 1a).

14. Regarding claim 24, Gaku et al discloses wherein each solder ball protrudes from the heat resisting sheet and the covering sheet conforms to the shape of the protruding portions of the solder balls (Figure 5).

15. Regarding claim 27, Gaku et al discloses wherein the covering sheet directly contacts the solder balls (Figure 1, reference 1a).

16. Regarding claim 28, Gaku et al discloses a solder ball assembly for use in the formation of solder bumps comprising a heat-resisting sheet having a plurality of holes formed therein and having a first side facing upwards and a second side facing downwards and comprising first and second heat resisting layers (Figure 1, reference 4d), each hole opening onto the second side of the heat resisting sheet (Figure 1, reference 6e), a solder ball disposed in each hole and protruding from the hole at the second side of the heat resisting sheet (Figure 2, reference 7-1i), and an adherent layer sandwiched between the first and second heat-resisting sheets and spaced from the second side of the heat-resisting sheet and exposed to the interior of each hole in such a manner that the adherent layer contacts and holds the solder ball in the hole (Figure 1, reference 4c).

17. Regarding claim 29, Gaku et al discloses a solder ball assembly for use in the formation of solder bumps comprising a heat resisting sheet having a plurality of holes formed therein and having a first side facing upwards and a second side facing downwards and

comprising first and second heat resisting layers (Figure 1, reference 4d), each hole opening onto the second side of the heat-resisting sheet (Figure 1, reference 6e), a solder ball disposed in each hole (Figure 2, reference 7-1i), and an adherent layer sandwiched between the first and second heat resisting sheet and spaced from the second side of the heat-resisting sheet and exposed to the interior of each hole and contacting and holding the solder ball in the hole and supporting the entire weight of the solder ball (Figure 1, reference 4c).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gaku et al (6,097,089) in view of Akagawa (5,866,415).

18. Gaku et al discloses a heat resisting sheet (Figure 1, reference 4d), a substrate (column 11, line 57), hole (Figure 1, reference 6e) and a solder ball (Figure 2, reference 7-1i). However, Gaku et al does not disclose any electrodes.

Akagawa discloses electrodes (column 2, lines 41-67 thru column 3, lines 1-6).

It is obvious, at the time the invention was made, for one having ordinary skill in the art, to modify Gaku et al with the teachings of Akagawa for the purpose of using electrodes to keep the heat resisting sheets electrically conductive with the solder bumps.

Response to Arguments

19. Applicant's arguments with respect to claims 1-9, 18 and 21-24 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

20. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monica D. Harrison whose telephone number is 571-272-1959. The examiner can normally be reached on M-F 7:00am-3:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Monica D. Harrison
AU 2813

mdh
January 18, 2006

LAURA M. SCHILLINGER
PRIMARY EXAMINER